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APRIL, 1929

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CONTENTS

Gunder—North American Institutions Featuring Lepidoptera (Plate III) . . . 101
Hicks—The Nesting Habits of Anthidium mormonum fragariellum Ckll. (Hym.: Megachilidae) . . . 105
Hebard—Entomological Collecting Equipment for the Western United States, with Special Reference to Orthoptera . . . 110
White, Fulton and Cranor—Clothes Moth Prevention as Adapted to the Needs of the Housekeeper . . . 117
Cockerell—A Journey Round the World . . . 122
Brower—Notes upon Calephelis borealis and other Rhopalocera in Missouri (Lepid.) . . . 125
Seybolt—An Amateur Entomologist of 1762 . . . 126
Entomological Literature . . . 127
Review—Handschin's Praktische Einführing in die Morphologie der Insekten . . . 132
Review—Dozier's The Fulgoridae or Plant-Hoppers of Mississippi . . . 133
Obituary—William Rhodes Reinicke . . . 134

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ACADEMY OF SCIENCES, SAN FRANCISCO, CALIF.

E. P. VAN DUZEE
DR. E. C. VAN DYKE DR. E. H. BURKE
JAMES E. COTTLE

ENTOMOLOGICAL NEWS

VOL. XL. APRIL, 1929 No. 4

North American Institutions Featuring Lepidoptera. III. The Academy of Sciences, San Francisco, California.

By J. D. GUNDER, Pasadena, Calif.

(Plate V.)

Very little has been written and really nothing published concerning the early history of the California Academy of Sciences at San Francisco, yet it is the oldest scientific organization of its kind in western America. I am indebted to Mr. James E. Cottle and others for much time spent in ascertaining for me a few of the following historical facts.

It seems that some twenty-two San Francisco men of scientific bent of mind were assembled on April 4, 1853, in the offices of Col. Thomas J. Nevius, at what was then 174 Clay Street, to discuss the founding of an Academy for the development and study of natural phenomena. There is little evidence that any of these gentlemen were collectors or naturalists in the zoological sense of the word, but eight of them were prominent physicians in the city and several were ministers of the gospel. At a second, more formal meeting, which took place on the 16th of May following, a constitution was adopted and a corps of officers elected. Thus we find that Dr. Andrew Randell became the first president of what was then termed the Academy of Natural Sciences. Later, in 1868, the name was changed to simply the Academy of Sciences. From the first little gathering-place on Clay Street, the society moved into an old discarded Baptist church on the southwest corner of California and Dupont Streets. Here their meetings and lectures began to attract genuine public interest. Eventually, James Lick, of Lick Observatory fame, deeded to them a valuable piece of land at 819 Market Street, in the very heart of the down-town district. Again, several years later, they were fortunate in becoming one of the three residuary legatees to his vast estate from which was derived about $450,000. With

ENTOMOLOGICAL NEWS.
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most of this money, an Academy building was erected on the Market Street property and moved into during the summer of 1891. From then on the Academy was on a firm financial basis. Its exhibits, library and laboratories occupied a separate rear portion of the building, while the front part was leased to business offices from which a considerable income was generally derived. A noteworthy visitor to the Academy in the early 70's was Louis Agassiz.

On April 18, 1906, the great San Francisco earthquake and fire left the Academy in ruins.[1] It was a tremendous loss. Everything was destroyed and practically nothing saved. The fire did not reach that section of the city until the second day; so, Mr. Loomis, the director, with the aid of Miss Eastwood, the botanist, and Miss Hyde, the librarian, managed to remove by hand a few books, some old records (from which this article is written) and a complete set of publications, together with the botanical types and certain types of Coleoptera, Hymenoptera and Hemiptera. All the Lepidoptera collections were burned, including Dr. Behr's collections and his type specimens. What little material could be carried out was moved into a store on Turk Street and elsewhere. Although temporarily stunned by its losses, the Academy almost immediately resumed activity and in a few months had rented space in the Security Bldg., near Market Street. Fire insurance money began coming in; a donation of $20,000 was received from Chas. Crocker and with the Lick endowment again bearing interest, the Academy went ahead and laid its plans for a real new home to eventually rise in Golden Gate Park, which is over on the western edge of the city towards the ocean and far away from any future fire hazard. The new Academy building was completed and occupied by 1915. It is partly shown in the accompanying illustration (Plate V). Its construction is of solid concrete and stone, making it practically immune from cataclysm. One good feature is its roomy, well-arranged laboratories which are probably better equipped for the use of the student than any other in

[1] Mr. W. G. Wright in the June, 1906, issue of the NEWS shows a picture of the buildings or what was left of them after the destruction.

the country. Dr. Barton W. Evermann is the present director and is interested mostly in ichthyology. An auditorium, an African Museum Hall and new library quarters are planned for the future.

The Academy's Department of Entomology was founded on January 6, 1862, by the appointment of a definite curator-in-charge and the following gentlemen have held that post to date: (Their chief interest is noted.)

Dr. H. Herman Behr, 1862-1867, Lepidoptera.
Mr. Richard H. Stretch, 1868-1880, Lepidoptera.
Dr. H. Herman Behr, 1881-1904, Lepidoptera.
Dr. Edwin C. Van Dyke, 1904-1916, Coleoptera.
Mr. Edward P. Van Duzee, 1916 to date, Hemiptera.

The entomological department is especially strong in the Coleoptera of western North America and in the Hemiptera of America, north of Mexico. It is estimated that the Lepidoptera collections number about eighty thousand mounted specimens. Almost one-third the moths listed in the 1917 Barnes Check List are catalogued, which makes this collection the largest of its kind in the west. Most of the specimens in all orders are kept in twenty-four drawer metal cabinets of the size and style of the several shown in the illustration. The butterfly collections consist of the well known W. G. Wright material and the collections of F. X. Williams, E. J. Newcomer and Albert Koebele. The Wright types and the particular specimens which went to make up his plates for the "Butterflies of the West Coast" are of special interest. There is also a sizable collection of western diurnals purchased from the late Chas. L. Fox.

Mr. E. P. Van Duzee, the present curator of Entomology, is well known for his work in the Order Hemiptera, but he has always taken a great deal of interest in Lepidoptera, especially Heterocera. "EP" was born in New York City, April 6, 1861, and his first entomological work was on moths under the personal guidance and encouragement of A. R. Grote, at Buffalo, from 1876 to 1882. He published a list of the Lepidoptera of Buffalo, New York, in 1894. From 1885 on, his scientific work with insects has been almost entirely in the Hemiptera on which more than one hundred papers have been published. For

twenty-eight years he was connected with the Grosvenor Library at Buffalo. One year was spent at La Jolla, California, with the Scripps Institute for Biological Research. For two years the University of California, at Berkeley, claimed his services and from there he came to the Academy in 1916. All of his collections have been donated to the Academy. Mr. Van Duzee has made the following interesting field trips: Muskoka Lakes, Canada, in 1888; Michigan in 1891; Georgia in 1899; Colorado and Utah in 1900-3; New Jersey in 1902; Jamaica in 1906; Florida in 1908; New Hampshire and Maine in 1909; Ottawa in 1912; Lake Tahoe in 1915; San Jacinto Mountains, California, in 1917; Siskiyou County, California, in 1918; Huntington Lake, California, in 1919; Washington and Vancouver Island in 1920; Gulf of California in 1921; Utah in 1922; Arizona in 1924; Truckee, California, and Nevada in 1927. There are very few entomologists who can claim as active and unbroken a fifty-three year period of service for science as can E. P. Van Duzee.

The accompanying illustration shows Dr. Edwin C. Van Dyke, the well known Coleopterist, as well as Dr. H. E. Burke, a forest insect specialist who happened to be visiting the Academy when this picture was taken. Dr. Van Dyke may well be considered the best authority on beetles in the west.

I am particularly pleased to be able to include in this plate, a picture of Mr. James E. Cottle. He is undoubtedly the oldest living lepidopterist on the coast and personally knew all the bygone collectors like Behr, Letcher, Fuchs, Mueller, Rivers, Harford, Dunn and many others. Several years ago he retired from long, meritorious duty in the San Francisco Police Department and since then has been more than ever active in building up his collections of butterflies and moths. Jim Cottle was born in New York City on July 10, 1861 (same place and year as Van Duzee). When a small boy his folks moved westward to San Francisco and he has lived there ever since. In 1901 he married Magdelina Schulthress. Years ago, when an employe in the Hibernia Bank, he became ill and was sent to Anderson Springs to recuperate. While there an acquaintance was made with Beverly Letcher and from then on, according

to Cottle, "I became a chaser with the net!" Anyone visiting San Francisco should look up Jim Cottle and see his collection. He can tell you all about the good old collecting grounds and besides it's a pleasure to meet and know Mrs. Cottle.

In 1901 Chas. Fuchs and others established the California Entomological Club, which, a year later, changed its name to the Pacific Coast Entomological Society. This organization meets quarterly and publishes an annual Proceedings. Since July, 1924, it has published the *Pan-Pacific Entomologist,* a good quarterly journal and one of which the Society may well be proud. Mr. Van Duzee is the editor.

The Nesting Habits of Anthidium mormonum fragariellum Ckll. (Hym.: Megachilidae).

By CHARLES H. HICKS, University of California at Los Angeles.

The facts in regard to the relationships of *Anthidium mormonum* Cresson and its allies have been reviewed and discussed by Professor T. D. A. Cockerell[1] and later by Herbert F. Schwarz[2]. The relationships in this group are very complicated and are ably treated in these two papers.

In the spring of 1928, while observing bees nesting in the ground or visiting flowers near Pasadena, California, *Anthidium mormonum fragariellum* Ckll.[3] was seen many times. She early attracted my attention but succeeded in eluding my searches until *Callanthidium illustre* (Cresson), nesting in stumps, was studied. The two species were found in numbers at the stumps and many facts were obtained concerning their nesting habits. A review of the more important ones in regard to *A. mormonum fragariellum* is given below.

The observed nesting period of this bee extended from March 14th to June 2nd and may be somewhat longer. During this period field observations were made; later nests were obtained from the stumps, after having been located by finding tunnels

[1] T. D. A. Cockerell. Anthidiine bees in the collection of the California Academy of Sciences. Proc. Calif. Acad. Sci. 14: 345-367. 1925.

[2] Herbert F. Schwarz. North American bees of the genus *Anthidium.* Amer. Mus. Novitates, No. 252: 1-22. 1927.

[3] Kindly determined by Professor P. H. Timberlake.

whose entrances were stopped with down, the cells removed and the insects reared in the laboratory.

The nests of down and pebbles are placed in the deserted burrows of coleopterous larvae in old, dead, live oak stumps and others. The bee, when a nest is started, begins by seeking a suitable cavity for her cells. Many different individuals have been observed inspecting the available tunnels, entering some, merely passing by others, or giving much attention to a suitable one. This attention is shown by the bee repeatedly entering and leaving the tunnel, flying about it, or returning to it after a brief flight elsewhere. Finding it of the right size and its walls of a sufficient degree of smoothness and hardness she begins nesting activities, sometimes by first removing some debris, or if the tunnel is clear, by obtaining down at once. Tunnels with rough projections on the walls, such as were found in some of the improvised ones formed with a brace and bit in an old yucca flower stalk, are quickly rejected, the bee emerging in a hurry.

Near the end of a nesting season the available tunnels are much in demand, as was evidenced at these stumps at Pasadena, and there is some competition for their use. In other localities where stumps or logs are more abundant and tunnels more plentiful, and where the wood is not too old and soft, this competition is not so keen. A dearth of ready tunnels in a given nesting territory causes the bee to waste much valuable time in a vain search as well as giving rise to an occasional, though not deadly, combat between the females. One such combat was witnessed and recorded on May 12th.

While observing an insect a few feet away, my attention was suddenly attracted by some insects flying heavily to the ground. Coming immediately upon the scene, I found two females fiercely fighting. Each had the other by a fore leg, held with the mandibles with which they were intermittently biting, intervaled every few seconds by an attempt to sting one another. Occasionally there was a loud buzzing of wings as they fought more actively. The contest lasted one minute and forty-seven seconds, at the end of which time one flew away while the other flew to her nest. It is probable that both had been trying

to use the same tunnel for previously two bees had been watched at this tunnel, each attempting to appropriate it for her use.

The length of the tunnel used by *A. mormonum fragariellum* varies from 22 to 65 mm., with an average of 40 mm. from 6 nests measured. The outer diameter varies, depending on the tunnel appropriated, which in turn depends upon the species of beetle previously using it. The diameter of one tunnel measured 7 by 5 mm.; that of another, 7 by 6 mm. The entrance to the tunnels may be readily located by surveying the outer surface of stumps and logs and finding the exit holes of beetles, plugged flush with the surface with down. This down, early and before the weather has had time to dull it, is bright and easily seen; later it beomes darkened and some of it may be lost from one cause or another. This outer plug is usually short, being from 4 to 10 mm. in length (average of 6 mm. from 4 nests). Below this a space has always been found, filled with pebbles and debris often mixed with soil. The soil used is fine and sometimes especially abundant, an apparently unusual material for nesting among the Anthidiine bees. The length of the tunnel used for this material has been from 7 to 12 mm. long.

Usually below this outer region, filled with pebbles and soil, the down above and continuous with the cells of the bee is found. In a few instances, however, there has been a second and inner plug of down followed by a space filled with pebbles. A nest taken on May 30th illustrates this condition. It consisted of a plug of down to the outside, flush with the surface, measuring 4 mm. in length; next, 11 mm. of pebbles, soil, etc.; a partition of down of 5 mm.; a second series of pebbles, 4 mm. long; and finally, the down of the nest 14 mm. long and containing one cell with a larva. This larva was 8 mm. in length, full grown and ready to spin its cocoon.

The down immediately about the cells, varies in length depending upon the number of cells it contains. The number of cells to a nest has been found to vary from 1 to 4 with an average number of 1.44 from 25 nests. Females have been observed gathering down, pebbles, soil, small pieces of stems, and the like, and carrying them to the nest. They gather the down from the hairy leaves and stems of *Lepidospartum squamatum*.

When obtaining pebbles, one bee selected and carried 26 loads in 5 minutes from a rather definite place 13 feet and 5 inches from the nest. The nest entrance, in this instance, was nearly parallel with the ground and the bee often barely alighted at the edge, releasing the pebble within, while hesitating but a moment on the wing before quickly flying away. After 4 or 5 loads, however, she entered and arranged them with her mandibles. Having finished with the pebbles, she immediately began securing down, which after 6 trips filled the tunnel even with the surface. The nest complete this bee began entering vacant tunnels and searched as though looking for another nest site. This instance and others affords evidence that as soon as the female has finished one nest she may immediately begin another. Since there is often but one cell to a nest, *A. mormonum fragariellum* must, of necessity, and on the average, provision a number of them.

Loose soil from the surface has many times been observed carried by the bee in her mandibles to the tunnel. This fills in the spaces between the pebbles (the proportion of pebbles to soil varies considerably among different individuals) and would appear to aid somewhat in forming a more compact block against enemies as well as keep some rain from entering. Rain sometimes causes damage to the nest and its contents, when it comes heavily before the cells are completed and the protection placed on the outside.

During the season's study of this bee and later, from nests taken from stumps, parasites have been secured. The most common is a beautiful, little, metallic bee, *Chelynia leucotricha* Ckll.,[4] taken early at the stumps where *A. mormonum fragariellum* was nesting. The parasite remained about, entered and frequented the nesting tunnels of the bee. On a few occasions I have seen the parasite enter a tunnel being provisioned by the host, almost immediately come out, turn about outside and back within out of sight. Her actions suggested very strongly that she had gone within to lay an egg and agreed with similar observations, reported in a recent paper (Hicks),[5] on *Stelis permaculata* Ckll., a parasite of *Heriades carinatus* Cress.

[4] Determined by Professor P. H. Timberlake.

[5] Charles H. Hicks. Stelis permaculata Ckll., a parasite of Heriades carinatus Cress. Entom. News, 38, (10): 297-300. 1927.

The cocoons of the host agree very well with those formed by Anthidiine bees and especially with the ones made by the bees of the genus *Anthidium*. The mammillary projection is especially conspicuous, however, and shows some variation in size.

The males apparently do not seek the females very often, if at all, at the nesting sites for none were observed at the stumps. Neither have they been seen at the flowers mating with the females, although this would seem to be the place to expect them. Possibly the failure was due to not enough time having been spent at the flowers. My first acquaintance with the male occurred when one emerged from his cocoon on October 18th. The cocoon, from which he emerged, had been at slightly above room temperature, on the average, during the period from June 2 to October 18.

The females on several occasions have been found to rest or sleep in the tunnels during the night or when the weather was cool, cloudy or rainy. They crawl within and remain with their abdomens towards the outside, sometimes quite or nearly exposed. A female may sleep at night in the tunnel in which she is nesting until it is finished. Late one evening I found two females of *Callanthidium illustre* (Cresson) and a female, *A. mormonum fragariellum* close together in a single cavity in a yucca flower stalk.

The ease with which the cells of this bee may be secured throughout the year, the large number of nests often found in a single stump, the insects and parasites secured in obtaining these, and the ease with which they may be reared in the laboratory, together with the resulting facts obtained (i. e. sex ratios, ratio of parasites to host, ratio of one parasite to another, effects of temperature on rate of development, etc.) commend this species for further study.

One nest of this bee, which consisted of three cells in a row in usual order, contained a Tenebrionid beetle pupa in each of the outer cells. The middle cell contained a typical cocoon of the bee. Each pupa was completely surrounded by the down of the cell and there was no evidence that this down had been broken by an insect entering it. The pupa soon reached matur-

ity in the laboratory. One was killed and pinned, the other remained alive within its vial for five and one-half months. It died at the end of this period and was later determined as *Aphanotus brevicornis* Lec. by Dr. L. J. Muchmore of the Los Angeles Museum. Whether the beetle larva ate the food provided for the bee larva or destroyed the latter could not be definitely determined from the nest content.

One beetle, the tunnel of which *A. mormonum fragariellum* sometimes appropriates is *Polycaon stoutii* Lec.[6] This beetle likewise was able to live without food, after having reached maturity, for over five months. The writer hopes to present in the future additional facts concerning the relationship of this bee to other insects, especially her parasites.

Entomological Collecting Equipment for the Western United States, with Special Reference to Orthoptera.

By MORGAN HEBARD, Philadelphia, Penna.

During some twenty years of entomological field work, with Mr. James A. G. Rehn, of the Academy of Natural Sciences, we have gradually discarded unnecessary equipment, condensing the outfit to a point where little that will not be used is now included. Some of the data obtained may be of use to the entomological collector, contemplating field work for the first time, particularly if Orthoptera is one of the orders to be sought.

In the first place the usual clothing is worn at the start of the journey, light if warm regions are to be visited and heavier if colder climates are to be encountered. Additional sets of underwear and socks, several shirts, neckties, handkerchiefs and toilet articles complete this part of the equipment, a cap sometimes being useful en route. An overcoat is unnecessary, though a light rain-coat, or better a poncho, is advisable if a region of frequent rain is to be visited at any time during the trip.

The camp equipment depends more on the type of transportation to be used. In a light motor truck I would carry a "Gold

[6] Kindly determined by Mr. A. C. Davis.

Medal" or similar knock-down army cot, several blankets and a pillow. Only the blankets are indispensable, but with days of hard work the energy of the individual shows real deterioration unless restful sleep can be obtained. A light knock-down table is also most serviceable, but rather a luxury in camp. On the other hand a "Coleman" or similar gasoline pressure lamp is absolutely essential, primarily for packing material and writing notes after dark, but also to secure night-flying species. A liberal supply of extra lamp mantles should also be brought, for sometimes a set will stand hard usage for days and the next shatter at the first severe jolt. A tent can be carried and is needed if heavy rains are to be expected, but enough waterproof canvas to keep the bedding dry is alone essential in most of the western United States. Putting up and taking down a tent causes serious loss of time unless stops of several days in one spot are contemplated, when a tent is pleasant, not only as a refuge in bad weather, but also as a safe place of storage and a shelter from wind, which later may prove extremely trying when packing material, either on the plains, the desert or the mountains. If a tent is carried, poles and sufficient stakes must also be secured, as in many places where it is likely to be used such can not be found.

The cooking equipment for camping may be reduced to frying pan, one or two small pots, coffee pot, large knife, can opener and cup, fork and spoon per man; but knives, a bucket and a dutch oven are often very welcome.

The food equipment depends greatly on the region to be covered, but the following has proved amply sufficient for three men for a week in the arid or semi-arid west. Twelve dozen eggs, crated; 1 side of bacon; 3 lbs, coffee; 7 loaves of bread (preferably a few purchased every two or three days); 1 box flap-jack flour; 2 large jars of jam; 7 cans of tomatoes; 4 cans of baked beans; 3 cans of chile con carne; 7 cans fruit (cherries, peaches and pears are usually the most satisfactory); 14 small tins condensed milk; 3 lbs. sugar; several pounds of butter (packed deep in load, which preserves from melting astonishingly), salt and pepper. One of the pleasantest additions to the above is a steak or other cut of fresh meat, added

on passing through a ranch or village. Fresh vegetables and potatoes are also very satisfactory, but as a rule take just sufficiently more time to prepare than we have rarely found time available. In regions where game can be secured, the pleasantest of all additions to the normal diet is available if a shot-gun and box of shells is added to the equipment. Like fishing, however, considerable time is often needed in a strange country to secure in that way sufficient food for three men for even a single meal.

Of all these items canned tomatoes are the most important in the desert. They alone will quench the thirst and should the water supply fail they might prove vital.

In cooking, the dutch oven, a kind of deep frying pan with tightly fitting iron lid, gives splendid results over the camp fire. Both parts are heated and the food, cooked from both above and below, is more appetizing and more healthful than when fried.

Water is all important, as we have found that unless equipped to make several dry camps in succession it is often impossible to give a region thorough examination in the areas where best results can be obtained. Ten gallons of water should be carried and a load of twenty is far more satisfactory; contained in a barrel with a long rubber tube to syphon it out whenever needed without disturbing the rest of the load. In addition a quart canteen per man is almost indispensable.

Morover extra gasoline should be included, ten gallons in two sealed five gallon tins removing any worry on this score.

A medicine chest must be carried and should contain mercurichrome, sodium bicarbonate, aromatic spirits of ammonia, aspirin, a laxative, a purgative, bismuth subgallate (5 gr.), quinine (5 gr.), strychnia (1/8 gr.), potassium permanganate or (better) antivenin (for snake bite), a little gauze, newskin and adhesive tape.

The camp clothing needed consists of a fairly broad-brimmed felt hat, a sweater, light shirts or very light and medium olive-drab woolen shirts, khaki or woolen riding trousers, two light undershirts and underdrawers, several pair of heavy socks, leather puttees and at least two pair of moderately heavy shoes, large enough to fit comfortably over

two pair of heavier socks. Very light shirts are needed particularly if work is to be done during the hot months in Death Valley, Imperial Valley, or other places of extreme heat. Undershirts but not under-drawers can be dispensed with in hot weather. Whatever the region and even with a sweater in reserve, heavy as well as light shirts are essential, as the contrast in temperature between noon and after dark is often very great. One pair of field shoes should, if possible, be broken in, as one is very apt to become lame wearing new field shoes unless they are alternated with old ones. Spare shoe laces are also often useful, and only the very strong survive. In one pocket should always be carried a compass and matches.

The collecting equipment requires two hand electric flashlamps and extra batteries, a supply of about one cyanide bottle per man per week, several small cyanide bottles for the more delicate specimens, two pair of tweezers, a note book, a fountain pen, pencils, one pair of good scissors, a small pair of straight manicure scissors (for evisceration), a small bottle of formaldehyde solution, about one-half pound of napthaline per week, a napthaline shaker (made out of a small tin with large holes punched in the lid), numerous blotters, needles and thread, a small screw-driver (mainly for putting together the collecting nets), a net frame per man per week and two net bags for the same period.

We have found the standard "Harrimac" fish landing-net frame the best, using only the first section of the wooden handle. This is a net about 14½ inches in diameter and slightly longer than wide, with a 24 inch handle. The net bags have to be made and the heaviest unbleached muslin is the best material. For our work the bag is 20 inches in depth, allowing a maximum depth that can be reached easily with the hand, the bottom very broadly rounded so that there are no pocketed corners and the material turned over twice along the rim. In this way two thicknesses must be worn through to reach the steel net rim where, along its extremity, the wear and tear is greatest. These nets are made symmetrical so that after some use they can be reversed on the frame, the protected basal portion of the rim then receiving the rough treatment and in this way nearly double work can be done with a net. It

must be remembered that a large portion of the most interesting Orthoptera is not taken by pursuit in the open but by strenuous beating of shrubs, trees and brush, often covered with thorns.

I know of no better equipment for collecting Lepidoptera, particularly in the tropics where many forms show greater activity, than this same net frame using two of the wooden handle sections and a slightly deeper bag of green mosquito-netting. In spite of contrary arguments I have heard, I am convinced that many butterflies will take fright much more quickly at a white than at a green net, though as much immobility of the net before striking as may be possible is very important.

The final packing of material is a difficult problem. Triangular papers such as are generally used for Lepidoptera serve well with small series of Orthoptera, particularly if the paper is not stiff. When taken in quantity, however, that method becomes very unsatisfactory. We have used for a long time with great success cigar boxes, each containing about fifteen carefully cut and tightly fitting layers of sheet cotton. This is known as "cotton batting" and its surface holds the specimens but not entangling them, as plain cotton batting or jewelers cotton was found to do. One box a day is usually sufficient, but in rich regions we have filled many more in that length of time, so that an extra supply of this cotton should be carried, cigar boxes being easily obtained unless very isolated regions are to be investigated.

Most Orthoptera should be packed as closely as can be without specimens actually touching each other. A sprinkling of napthaline, a slip with a note book number and number of specimens on the layer in a circle beneath and the next layer of cotton is placed. The napthaline is indispensable as it prevents mould and also damage from insects or small animals. Great care must be taken to keep the box full of extra cotton layers until filled with specimens and several days later, when the contents has settled, additional layers should be added. The method of packing involves risk not only of damage to specimens but also mixing of layers unless the box is kept *tightly* packed at all times.

Though all Orthoptera will keep if given a reasonable chance to dry and not too closely packed, all large bodied specimens should, if possible, be eviscerated. This is done by slitting the under side of the specimen longitudinally from metasternum to the middle of the abdomen. The crop is then grasped with the tweezers as far toward the head as possible and pulled out. The specimen is then reversed, the forceps re-inserted and the intestine is similarly grasped near the other end of the body. A careful pull then removes the entire alimentary tract, the greatest care being used to keep the apex of the abdomen from telescoping, and a firm hold of that portion being necessary to prevent this. It then remains to extract the eggs or the sperm sacks. Only specimens with soft body walls need to have a little cotton inserted. All green individuals should be slitted or eviscerated and dropped into the bottle of about 2% formaldehyde. They can then be taken out almost immediately and dried on blotters. Much more time is required to entirely dry out the eviscerated examples with pieces of blotting paper and this must be done, as we have found that unless thoroughly dry such specimens will deteriorate and at the same time seriously injure other specimens packed near them. Use of a 5% solution or over at first led us to believe that this method of fixing green colors had little merit, as even that weak strength did damage. Later material packed when only dry externally did much damage. The method suggested above has, however, met with great success. We originally put at least some cotton in each specimen eviscerated, but have found this to be quite unnecessary except for soft-bodied species. The time saved by less "stuffing" has, however, been more than lost whenever green material is properly treated.

About camp an axe is always useful, and where roads have been bad a pick and shovel have helped more than once.

Though it may appear that considerable equipment has been suggested, we have found that for the best work little can be omitted. We have usually packed all but the camp outfit and some of the extra packing boxes and cyanide bottles in three waterproof telescopes, the best size being about 22 by 14 by 10 inches. The balance we have shipped in a trunk to the point

where camping would begin. The telescope is vastly superior to the suit case in that it need never be set on its side and may be tightly packed though its content may vary from half to fully its capacity.

We prefer puttees and moderately heavy shoes to boots largely because they ventilate better and the latter are so much more difficult to pack in small spaces. Hob-nails should never be used in the desert regions as the heating of the nails on the bare ground makes them almost unendurable.

When we first began our work it was possible to make many stops in the west without camping equipment. A great many places on the railroads were very small, there was often a reasonably good hotel and collecting could be commenced at very short distances. The growth of towns and land under cultivation has made a motor, then rarely to be found, essential for effective work without serious loss of time. Though in this way probably more favorable locations are reached, the cost has been greatly increased. A motor for working over a territory of a thousand or more miles in several weeks, with a complete camping outfit, is in consequence now the most effective method. Though the city rate for motor and driver is often five dollars an hour, we have been able to secure a truck and a good man to drive and cook for as low as seven dollars per day, not including gasoline, oil and food. A covered truck is the ideal equipment, our preference being for a car as large or larger than a Dodge. A man who will drive and cook and who knows something of the region to be visited will enable the collectors to accomplish far more than would otherwise be possible. Even with these advantages a satisfactory survey of a reasonably large area in a few weeks means sufficient hardship and hard work to discourage all but the eager and physically fit. Packing and often collecting specimens far into the night, minor mishaps, unavoidable delays and often the need to investigate the life zones in mountains to their summits, on horseback if horses can be found, otherwise on foot, brings a strain that is endurable only because one is constantly in the open air and continuously exercising throughout the day.

Clothes Moth Prevention as Adapted to the Needs of the Housekeeper.

By HELENE WHITE,* B. B. FULTON, and KATHERINE T. CRANOR, Home Economics Division, Iowa State College, Ames, Iowa.

Clothes moth prevention is a subject of growing interest not only to scientists, but to homemakers as well. The damage done by the clothes moth is at least one-half as great as that done by fire. A leaflet distributed by the Better Fabric League of America estimates the annual loss from those insect pests as one hundred million dollars.

There are few homes in the land whose woolens, furs, rugs or upholstered furniture have not at some time been infested by the clothes moth. Many homemakers still believe that such worthless remedies as printers' ink of newspapers, red pepper, borax, tobacco leaves, red cedar leaves, or eucalyptus leaves, have value. Where worthwhile remedies, such as naphthalene crystals, and paradichlorobenzene, are used, they are not applied in the most efficient manner. These facts are indications that much education is needed concerning the satisfactory control of these insects.

It is hoped that this research may give some practical information to the average consumer, as well as to the teacher of Textiles and Clothing who has an opportunity to emphasize the importance of making systematic efforts to guard properly against the depredation of the moth.

This study was started in January when clothes moth larvae seemed to be scarce in Ames. Various efforts to find infestations met with small success. By April larvae enough for the proposed experiment had not been found. Therefore, an advertisement for clothes moth larvae was inserted in the Iowa Student and the Ames Tribune. As a result of advertising and spring cleaning many infestations were reported during that month.

One housewife was found to have mohair upholstered furni-

*This paper is the experimental part of a thesis offered by the senior author in partial fulfillment of the requirement for the Degree of M. S., in Textiles and Clothing, June, 1927.

ture badly infested with the webbing clothes moth. In another home were discovered webbing and casemaking larvae, "Buffalo moth" larvae, and black carpet beetle larvae. These were found in stored woolens and furs, and among seldom used toys. Doll's hair seemed to be the favorite food from the toys. Other Ames-donated infested material included a fur cap, a jersey coat, and an army uniform.

From the many scources reported it is evident that the webbing clothes moth, *Tineola biselliella,* is much more common in Ames than the case-making, *Tinea pellionella.* Since the webbing clothes moth larvae were easier to obtain, they were used in all experiments.

Infested fabrics were placed in two insect cages, 1 x 1 x 2 feet, in the bottom of which was kept moist sand to insure a desired humidity. These were put into a small room, the windows of which had been covered with beaver board to provide darkness. This room was kept at an approximate heat of 25°C.

Material next to the wet sand became moldy. More larvae were found to feed on this than on the other parts of the fabric, probably because there was more moisture. During April an adult clothes moth would now and then appear in a cage. In May there were always two or three adults present. During June and the first part of July they were very numerous. By the last of June the fabrics were infested with a crop of tiny larvae, the new generation.

For the experiments in this research scoured wool, yarns, and fabrics of various weaves were used. These were all wool, and white with the exception of the moth-proofed blankets, which were of various colors. All samples were cut one by one-half inches with the exception of those used in one experiment.

Round tin boxes, twelve inches in circumference were used for experiments with the exception of two for which paste board boxes, six by ten inches, were thought more desirable because of their size. In the tin boxes were placed pieces of blotting paper which were kept moist. The cardboard boxes were placed in an insect cage containing moist sand.

When larvae were needed for experiments they were removed from the infested material with as little handling as

possible. At the time each set of experiments with moth- proofing solutions was started, a number of larvae were placed on a sample of batiste, untreated, as a check.

Experiment 1. To find the comparative attractiveness of scoured wool fleece and white wool fabric.

Four larvae were placed in each of five tin boxes with samples of fiber from a scoured wool fleece and a white wool blanket.

In two weeks' time, 80% of the larvae were found entangled in the wool fibers of the fleece. This indicates that clothes moth larvae prefer wool fiber untouched by manufacturing processes. This may also be due to the fact that the fibers of the fleece give them a greater opportunity to bury themselves in the manner they prefer.

Experiment 2. To find the comparative attractiveness of a dyed and an undyed wool yarn.

Two larvae were placed in each of five tin boxes with a sample of each of red and white yarn.

The red yarn although attacked, was injured only about one-half as much as the white yarn. It is probable that the dye was responsible for this.

Experiment 3. To find the comparative attractiveness of various weaves of white all-wool fabrics.

Folded samples, one and one-half inches by three inches, of each of the following materials were placed in a cardboard box.

a—Blanket; twill weave; loosely woven, and heavily napped.

b—Light weight sweater; knitted weave.

c—Baby flannel; plain weave, woolen yarn.

d—Gaberdine; twill weave, worsted yarn.

e—Felt; pressed fiber.

Two larvae were put within the fold of each sample. Ten such boxes were prepared. At the end of one month it was found that many larvae had spun cocoons. Because of this and to insure pronounced results, two more clothes moth larvae were added to each box.

About one-half of the larvae in each box collected on the blanket sample. When examined the nap had been eaten from this fabric. Knitted material was considerably damaged, flannel of plain weave slightly damaged, felt and gaberdine of twill

weave were almost untouched. These results would indicate that clothes moth larvae prefer the hairy, napped and loosely woven fabrics to the tightly woven hard finished ones. The only time the latter fabrics are attacked to any great extent is when the larvae have nothing else to feed upon.

Experiment 4. Testing of a commercially moth-proofed blanket.

> A sample of this wool blanket was placed in each of five pasteboard boxes with four larvae. A sample of moth-proofed blanket and a sample of untreated blanket were placed in each of five pasteboard boxes with eight larvae.

It was found that the commercially moth-proofed blanket was equally attractive to the larvae with untreated blanket samples of the same make.

Experiment 5. To test the effectiveness of Larvex, a moth-proofing solution.

> *a.* Five samples of white flannel, one by one and one-half inches, were saturated in Larvex solution by dipping, and slowly dried. Each sample with two larvae was placed in a tin box.
> *b.* Five samples of white flannel were treated as in a, and placed, each, in a tin box together with an untreated sample and four larvae.
> *c.* Five samples of batiste were saturated by spraying with Larvex, and allowed to dry slowly.
> Each was placed in a tin box with one larva on a sample. when the larvae died it was replaced.
> *d.* A sample of mohair upholstery material was treated and placed in a tin box with three larvae.
> *e.* A sample of blanket was treated and placed in a tin box with three larvae.

In the boxes which contained only flannel, after 14 days, 62% of the larvae were dead, 22% still alive and moving around, and 16% had spun cocoons. At the end of 24 days all the larvae had died except those in cocoons. No damage had been done to the fabrics.

Where both treated and untreated fabrics were used, 23% of the larvae were dead, 73% alive and 4% had spun cocoons after 14 days. The percentage of living insects was much greater in this group because part of them fed upon the untreated fabric. After 24 days a few more cocoons had been

spun and the rest of the larvae were still feeding. The treated material was not damaged.

Batiste samples were sprayed with Larvex until saturated, or dipped in a sufficient amount of the liquid. All the larvae on the batiste samples so treated were dead by the end of 18 days. The fabric was uninjured.

At the end of 14 days the mohair sample treated with Larvex was not harmed, although the larvae had spun tunnels of silk through the pile, and one had died. In the case of the blanket treated with Larvex, after 14 days the larvae had spun short tunnels through the nap, one had bitten off a few fibers and incorporated them into its cocoon, and one had died. These results indicate the Larvex soultion will make materials, on thorough saturation, repellant to the moth larvae to such an extent that they will refuse it as food.

Experiment 6. To test the value of Eulan F Extra, a moth-proofing compound.

a. A solution of Eulan F. Extra was prepared according to directions furnished by the manufacturer. Three-fourths of an ounce of the Eulan was dissolved in two quarts of water by boiling for five minutes, yielding a saturated solution.

Five samples of batiste were saturated with this by dipping, and slowly dried. Each was then placed in a tin box with one larvae. When this larvae died another was added.

b. A sample of batiste was treated with the solution as in "a" and placed in a tin box together with an untreated sample and four larvae.

c. A sample of blanket was treated as in "a" and placed in a tin box with three larvae.

Where five batiste samples were treated with Eulan F. Extra, the larvae ate small holes in two samples by the end of 30 days. The average life of a larvae on this material was 16 days, except in a few cases where cocoons were spun. In the case where a Eulan treated and an untreated sample were exposed to larvae, the treated sample was uninjured and the untreated slightly damaged. The larvae on the blanket sample had spun tunnels and died. These results indicate the Eulan F. Extra tends to prevent damage by moths.

(To be continued)

A Journey Round the World.

By T. D. A. COCKERELL, Boulder, Colorado.

We sailed from New York on the "Leviathan" June 11, 1927, and landed at Southampton. After a few days in England we took the S. S. "Soviet" from London to Leningrad, spending three days at Bremen on the way. At Bremen I was much pleased to meet my old correspondent Dr. Alfken, one of the leading authorities on wild bees, and to attend a meeting of the Bremen Entomological Society. We also saw the procession of the Men's Singing Clubs, which was meeting that year in Bremen. It included groups from all over western Germany. We were very cordially received in Germany, and when we got our visa in London, no charge was made. On arriving in Leningrad, we put up at the Hotel Europa, and visited the great museum of the Academy of Sciences, the Geological Committee, and the Botanic Garden, all of them establishments of the highest scientific standing, doing an immense amount of work. In a few days we were on the train for Siberia, going first to Moscow, where we were aided and shown the city by Professor David Ilovaisky, of the Academy of Mines. In the long journey to Irkutsk, in Central Siberia, we were very fortunate in having as a travelling companion a young Russian woman, Miss Ksenia Lukhmanoff, who spoke excellent English, and acting as interpreter, enabled us to converse with the various people on the train. At Irkutsk we found Mr. Trotsky (the real Mr. Trotsky, not Bernstein) who served as our guide and interpreter. We were allowed to live in the guest room of the Geological Committee, and were greatly assisted by the members of the Committee, and the biological staff of the University. We visited the Jurassic fossil beds at Ust Balei on the Angara River, and the Biological Station of the University of Irkutsk on Lake Baikal. Later we went to Archan, where we were most hospitably entertained by the director of the Sanitarium. We found the country about Lake Baikal very interesting, full of flowers and insects, and captured many new species of bees. Leaving Irkutsk, this time with Miss Alexandra Troubnikoff as our interpreter, we went to Tashkent, in Russian Turkestan, now called Usbekistan. We had to

spend a night on the way at Novo-Sibirsk, the new capital of Siberia, and to change trains in Russia at Kinel, near Samara. At Tashkent we found a large University, and were allowed to bring away collections of bees and snails to be studied. The snails have been published, and the bees are now being studied. We returned to Moscow, and thence on to Leningrad, and took the S. S. "Yamel" for London. The weather was very bad in the North Sea, and the small boat tossed about a great deal. We were the only passengers.

After a month in London, which gave me an opportunity to work up some of my materials at the British Museum, we sailed for the Orient in the "City of Karachi." We saw the rock of Gibraltar, and had a day at Naples, which enabled us to visit Pompeii and the Marine Biological Station. Leaving Naples, we had a good view of Mt. Etna on the way to Egypt, and on arriving at Port Said took the train to Cairo, later joining the ship at Suez. At Cairo we saw the Museum, and visited the Pyramids and Sphinx. The next place to go on shore was Colombo, Ceylon, and this gave us an opportunity to see Kandy, and the famous Peradeniya Botanical Gardens. Leaving Ceylon, we sailed for Calcutta, where we left the ship. We had about ten days in India, visiting Darjeeling and Agra, at the latter place seeing the Taj Mahal, at the former the great snowy peaks of the Himalayas. From Darjeeling we went to Rangoon, Burma (Dec. 14), and thence to Penang, where we met Miss Alice Mackie, who accompanied us to Siam, and was with us on the voyage to Australia and across the Pacific. We went by train from Penang to Bangkok, and then again by train northward to northern Siam. Leaving the train, we travelled four days through the jungle with carriers, and arrived at Nan, at the home of our friends Doctors Douglas and Mary Collier, on December 26. Christmas dinner was held over a day to await our arrival. We had a most interesting time in Siam, exploring the country, and making many zoological discoveries. After leaving Siam, we visited Kuala Lumpur, in the Federated Malay states, where there is an excellent museum. We then went on to Singapore, and took ship for

Australia, stopping at Batavia (March 5) and Surabaya (March 7) in Java. From Batavia we went to see the botanical garden at Buitenzorg, and were shown over by Dr. Karny, the distinguished Entomologist.

We first stood on Australian soil at Port Darwin (March 12), on the north coast, where we saw the black fellows and collected many insects. We had a day at Thursday Island, and proceeded down the beautiful coast of Queensland, between the barrier reef and the shore. At Brisbane (March 20) we visited the Queensland Museum and the University. I found things so interesting that I stayed three days, while Mrs. Cockerell and Miss Mackie went on to Sydney by sea. I went south by train and joined them there. We visited the Australian Museum, the Botanical Garden and other places in Sydney, and later on I undertook to write a book on Australian Bees for the Royal Zoological Society of Sydney. The greater part of our time in Australia was spent at Sandringham, near Melbourne, where we were the guests of Mr. and Mrs. Tarlton Rayment. Mr. Rayment has done more than any other man to study the habits of Australian bees, and has prepared an illustrated account of the species found at Sandringham.

We had intended to go to New Zealand, but the southern winter was now approaching, and we decided to go to New Caledonia instead. We took the S. S. "Suva" for New Caledonia, stopping at the Fiji Islands on the way, and seeing something of the excellent work in Economic Entomology carried on there. We had four weeks (May 14-June 12) in New Caledonia, and although we found few bees, we obtained many interesting snails. We had to go back to Sydney on the "Suva," and had a hard time, getting into one of the worst storms of recent years in that region. Leaving Sydney we crossed the Pacific, once more calling at the Fiji Islands, and then on to Pago Pago, in American Samoa. At this point Mrs. Cockerell and Miss Mackie left the ship and took the little "Lady Roberts" for British Samoa, while I went on to Honolulu, where they joined me two weeks later. We finally reached California just in time to hear Herbert Hoover's speech of acceptance at Stanford University.

So far (January 24th) 142 kinds of bees have been identified, 61 of these being new. When the work is completed, the total number of bees may approach 200. Of other insects, 212 species have been determined, most of them by the Imperial Bureau of Entomology, which has returned to me a large number of duplicates, beautifully mounted and labelled. Numerous new species and a few new genera have been detected. Mr. Curran has already published two Diptera from New Caledonia (the locality cited as Balky I. is really Bailly Island) and I have published three Mutillidae from Siam. The greater part of the material has been distributed to museums, especially the United States National Museum, British Museum, American Museum of Natural History, the Russian Academy of Sciences, the Australian Museum (New Caledonia spiders) and the Melbourne Museum (New Caledonia ants). My friends Dr. and Mrs. McKean of Chiengmai. Dr. and Mrs. Dr. Collier at Nan, and Dr. Kerr of Bangkok, have collected very many Siamese insects since I left, so that the Siamese collections are greatly increased. The Queensland Museum, the Australian Museum, Professor Nicholson of the University of Sydney, and the American Museum of Natural History, have submitted important collections of Australian bees, in which many new species have been found.

Notes upon Calephelis borealis and other Rhopalocera in Missouri (Lepid.).

Calephelis borealis is such an uncommon insect through most of its range that but little has been recorded regarding its habits, the early stages being entirely unknown. The writer had never taken anything except stray, worn males of the species until the season of 1926 when a number of perfect specimens, including perfect females, were taken. The curious habit of settling on the under side of leaves with outstretched wings like Pyralid and other moths makes the species an unusually interesting member of our butterfly fauna.

The locality, Willard, Missouri, is on the border of the Ozark Mountain Region. All the strays had been taken in the wooded hollows leading to a stream, and early in August 1926 fresh specimens were found in a limited area on the banks of this spring-fed stream. The locality was visited a number of times and specimens captured by sweeping the bunch grass and other plants growing there and capturing the weak flying insects as they arose. Owing to the scant amount of soil over

the solid rock the timber is sparse and stunted, giving the herbaceous vegetation a chance to flourish. The vegetation is more nearly characteristic of the prairies of the Middle West than of the Eastern States. The trees are all oaks. Freshly emerged females indicated the proximity of the foodplant, but no females were found ovipositing and the foodplant remains unknown.

Two rare records for Missouri were made in 1927 on the White River, in Taney County, Missouri, which borders upon Arkansas. On October 11th a beautiful example of *Catopsila philea* was seen to settle upon a bed of Zinnias, but the wary insect eluded the sweep of the net. Following two or three days of strong southwest winds, a badly battered female of *Eresia texana* was captured on October 23. *Terias mexicana* was fairly common along the river banks.

AUBURN E. BROWER.

An Amateur Entomologist of 1762.

An advertisement in *The Boston Evening Post,* July 19, 26, Aug. 2, Sept. 13, 1762, may find a place among the historical documents of the entomologist. It contains a brief, but interesting record of the practice of collecting, and of exchanging duplicates, shortly after the middle of the eighteenth century. The notice follows:

"A Gentleman in LONDON, whose Amusement for some Years past has consisted in collecting English insects, particularly of the Moth and Butterfly Tribes, and having obtain'd the various Species generally found in that Kingdom, is desirous of procuring some that are Natives of these Parts, either by Purchase or exchanging a Collection of English Duplicates.—The Author of this Advertisement would think himself very happy in the Correspondence of any Gentleman or Lady in America, of a similar Taste, or who would assist him in obtaining a Collection by either of the forementioned Methods (the latter of which would be the most eligible to him) in Consequence of which all due Regard will be paid to any Letter directed to Mr. DRURY, to be left at Mr. LEVER'S, the New-England Coffee House in Thread-Needle-Street, London."

Two years later, Mr. Drury republished his appeal (*The Boston Evening Post,* April 16, 30, May 7, 14, 21, June 4, 11, 1764) as an "Advertisement to the Naturalists," but with an added paragraph:

"N. B. Any Person delighting in this Branch of natural History, and willing to procure a Collection of the above Things, may by directing a Line as aforesaid, receive ample Instructions for that Purpose (if they don't perfectly understand the Methods of obtaining them) and also depend on receiving the full Worth of any Thing so procured."

An interesting account of Drury's life and works, by H. B. Weiss, appeared in the NEWS for July, 1927 (pp. 208-214), in which this practice of Drury's is mentioned. A catalogue of his specimens was published in London, 1805. The records are silent, however, concerning the moths and butterflies which he succeeded in obtaining from his American correspondents.

ROBERT FRANCIS SEYBOLT, University of Illinois.

Entomological Literature

COMPILED, WITH THE ASSISTANCE OF "BIOLOGICAL ABSTRACTS," UNDER THE SUPERVISION OF E. T. CRESSON, JR.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

The numbers **within brackets** [ ] refer to the journals, as numbered in the list of Periodicals and Serials published in the January and June numbers (or which may be secured from the publisher of Entomological News for 10c), in which the paper appeared. The number of, or annual **volume**, and in some cases the part, heft, &c. the latter **within** ( ) follows; then the pagination follows the **colon** :

All continued papers, with few exceptions, are recorded only at their first installments.

*Papers containing new forms or names have an * preceding the author's name.

(S) Papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

☞ *Note the change in the method of citing the bibliographical references, as explained above.*

Papers published in the Entomological News are not listed.

GENERAL.—Dampf, A.—El IV Congreso Internacional de Entomologia celebrado en Ithaca, N. Y., Los dias del 12 al 18 de agosto de 1928. [Bol. Oficina Defensa Agric. Mexico] 2: 692-729, ill. **Felt, E. P.**—A popular guide to the study of insects. [N. Y. State Mus.] 1929: 5-147, ill. **Foerster, E.**—Insektenschutz. [17] 45: 1-2. **Geiser, S. W.**—Naturalists of the frontier. I. Jacob Boll. [Southwest Review] 1929: 184-198. **Marelli, C. A.**—Un voráz enemigo del bicho de cesto. [Revista Soc. Ent. Argentina] 1: 37-38. **Myers, J. G.**—Additional notes on all-female families in certain insects. [Proc. Ent. Soc. Lond.] 3: 41-43. **Robson, G. C.**—The species problem. An introduction to the study of evolutionary divergence in natural populations. [Biol. Monographs and Manuals] 1928: 3-283. **von Dalla Torre, C. W.**—Obituary. [18] 22: 338-340, ill. **Weiss & Ziegler**—Notes on some wood engravers of North American insects. [6] 36: 421-431, ill.

ANATOMY, PHYSIOLOGY, ETC.—Eggers, F.—Die stiftführenden sinnesorgane. Morphologie und physiologie der chordotonalen und der tympanalen sinnesapparate der insekten. [Zool. Bausteine, Berlin] 2: 1-353, ill. **George, C. J.**—The morphology and development of the genital ducts of Homoptera and Zygoptera as shown in the life histories of Philaenus and Agrion. [53] 72: 447-485, ill. **Goldschmidt & Katsuki.**—Cytologie des erblichen gynandromorphismus von Bombyx mori. [97] 48: 685-699 ill. **Hasebroek, K.**—Atmosphäre und luftströmungen in ihren beziehungen zum industrie-und grosstadtmelanismus. [18] 22: 313-318, 321-335, ill. **Lischetti, A. B.**—Experiencias sobre la acción de substancias tóxicas sobre mosquitos adultos. (S). [Revista Soc. Ent. Argentina] 1: 29-32. **Morison, G. D.**—The muscles of the adult honey-bee (Apis mellifera). [53] 72: 511-526, ill. **Porchet, B.**—Contribution a l'etude des réactions immunitaires chez les invertébrés. [Bull. Soc. Sc. Nat.] 56: 553-560. **Roubaud, E.**—L'art paralyseur chez l'Abeille domestique. [25] 1928: 318-319. **Thomas, M.**—La fuite devant le danger et la simulation de la mort. [33] 68: 53-72. **Traub, V.**—Zur frage der entstehung des melanismus der industrie-und fäulnisabdünstungen in der natur. [18] 22: 188-189, ill. **Verlaine, L.**—Les réactions des antennes des Papillons aux températures élevées et aux chocs. [33] 67: 273-283.

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teros nuevos de la Republica Argentina. [Revista Soc. Ent. Argentina] 1: 33-35, ill.

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HEMIPTERA.—Ballou, C. H.—Los Coccidos de Cuba y sus plantas Hospederas. [Cuba Est. Exper. Agron.] 1926: 9-47. ***Davis, W. T.**—Cicadas belonging to the genus Diceroprocta with descriptions of new species. [6] 36: 439-458, ill. **de Azevedo Marques, L. A.**—Cigarrinha nociva a varias especies vegetaes. Biologia do membracideo Aethalion reticulatum. (S). [Inst. Biol. Defesa Agric. Rio de Janeiro] 1928: 3-27, ill. ***Drake, C. J.**—New and little known neotropical Tingitidae. [Iowa Sta. Coll. Jour. Sci.] 3: 41-56. ***Knowlton, G. F.**—Notes on a few species of Myzini (Aphididae) from Utah with descriptions of two new species. [4] 61: 9-15, ill. ***Knowlton, G. F.**—A new juniper aphid from Utah with notes on a few other species. [39] 12: 59-62, ill., cont. **Marelli, C. A.**—Anotaciones sobre Dacnirotatus bruchi. [Rev. Soc. Ent. Argentina] 1: 43-44. **Steer, W.**—The eggs of some Hemiptera-Heteroptera. [8] 65: 34-38, ill. **Van Duzee, E. P.**—A rare pentatomid. [55] 5: 52.

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SPECIAL NOTICES. — Genera Insectorum. — Diptera. Fam. Empididae by A. L. Melander. 1-434, ill. [Indispensable to students of this family.]

PRAKTISCHE EINFÜHRING IN DIE MORPHOLOGIE DER INSEKTEN. Ein Hilfsbuch für Lehrer, Studierende und Entomophile. By EDUARD HANDSCHIN, (Univ. of Basle). Sammlung naturwissenschaftlicher Praktika, Bd. 16, Gebrüder Borntraeger, Berlin, 1928. Pp. vii, 112; pls. XXIII. 11 Marks.

This commendable little volume is a kind of text book on external insect anatomy, in which descriptions of structures are reduced, as far as possible, almost to the form of definitions. It is intended that the student build his own morphological concepts directly from a study of the various modifications under which structures may occur. The book is a thorough laboratory manual, since all structures are illustrated by numerous preparations to be made by the student. These preparations, mostly in the form of permanent mounts for microscopic study, number about 135 and are derived from ninety of the commoner genera of insects. The text is not illustrated but the volume is accompanied by a separately bound atlas, which contains 194 figures and fits into a substantial pocket within the back cover.

In the usual type of laboratory course in insect anatomy, a relatively few individual species, taken from different groups, are studied in detail. This plan has its advantages, among which is its more economical use of the insect material studied. The other method of approach to the study of insect anatomy, used in the present manual, is radically different. After the introductory chapter, which contains directions for fixing and preserving material and for preparing mounted material for

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This "practical introduction" is a thoroughly organized treatment throughout, it is full of practical information for teachers and students, and like others of the series of "Praktika" of which it is volume 16, is a beautiful piece of scientific bookmaking, well printed on glazed paper.—R. G. SCHMIEDER.

THE FULGORIDAE OR PLANT-HOPPERS OF MISSISSIPPI, INCLUDING THOSE OF POSSIBLE OCCURRENCE. A Taxonomic, Biological, Ecological, and Economic Study. By HERBERT L. DOZIER, Technical Bulletin No. 14, Miss. Agr. Exp. Station, 152 pp., 35 figs. Dec., 1926 [My copy received July, 1928].

This publication summarizes work that has been carried on for several years and which has suffered not only delay, but the loss of new species described in the interval by other workers, and more unfortunately still of some excellent colored plates that were prepared by the author to embellish it. Nevertheless, it is still adequately illustrated by 35 text figures, chiefly by Dr. Dozier. Keys to the subfamilies, genera, and in most cases to species are given, with descriptions of sufficient detail to serve as a check on results obtained by the use of the keys. Mississippi records are cited, but the general range also is given.

and species of likely occurrence are included, so that the work is more than a mere state list. It will function very well no doubt as a manual of Fulgoridae (exclusive of Delphacinae) of the Southeastern States. The following new species are described in the publication: *Bruchomorpha bimaculata, Aphelonema viridis, Cenchrea mcateei,* and *Amalopota mcateei.*

All in all, Dr. Dozier's contribution is a worthy and welcome one toward the elucidation of a group of insects that have been rather neglected. This is still true of one subfamily, the Delphacinae, a baffling complex, which also we trust Dr. Dozier will be able to study and to illustrate in his very capable manner.—W. L. McAtee.

OBITUARY.

William Rhodes Reinicke, widely known librarian and head of the Apprentices' Library, Broad and Brandywine Streets, Philadelphia, Pennsylvania, died on March 5, 1929, in the Oncologic Hospital, where he had been a patient for several weeks.

Mr. Reinicke, son of the late Henry P. and Julia J. Reinicke, was 50 years of age and had been associated with library work since boyhood. For many years he was connected with the Bureau of Documents in the State Library at Harrisburg. He recently concluded the installation of the library in the Penn Athletic Club. He began his library work in the Wagner Institute, Seventeenth Street and Montgomery Avenue, and from there went to Harrisburg and then returned to this city and took charge of the Apprentices' Library. He is survived by his widow, two children and a sister.

In connection with his work in libraries he formed a collection of books injured by insects and of insects which injure books which was acquired by the late Mr. Joseph G. Rosengarten, a Trustee of the University of Pennsylvania, and presented by him to that institution. Mr. Reinicke was at one time an associate (1894), and later a member (1900), of the old entomological section of the Academy of Natural Sciences of Philadelphia and a member of the Feldman Collecting Social of the same city. He published an article "Insects Destructive to Books" in the *American Journal of Pharmacy* for December, 1910, pp. 551-562.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and only when necessary those at the top (being longest in) are discontinued.

Wanted—Moths of any species of the genus **Apantesis:** also eggs or larvae. Will determine specimens. Want to hear from anyone who will collect in this genus. Dr. E. T. Learned, Fall River, Mass.

Wanted—Names and addresses of collectors in foreign countries, also some second-hand insect cases. Write Mrs. Robert Milde, Lewiston, Minn.

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From Tibet (Bhutan):

Armandia lidderdalii
Parnassius hardwicki

CATALOGUES OF
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